July 8, 1961

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SCIENCE NEWS LETTER

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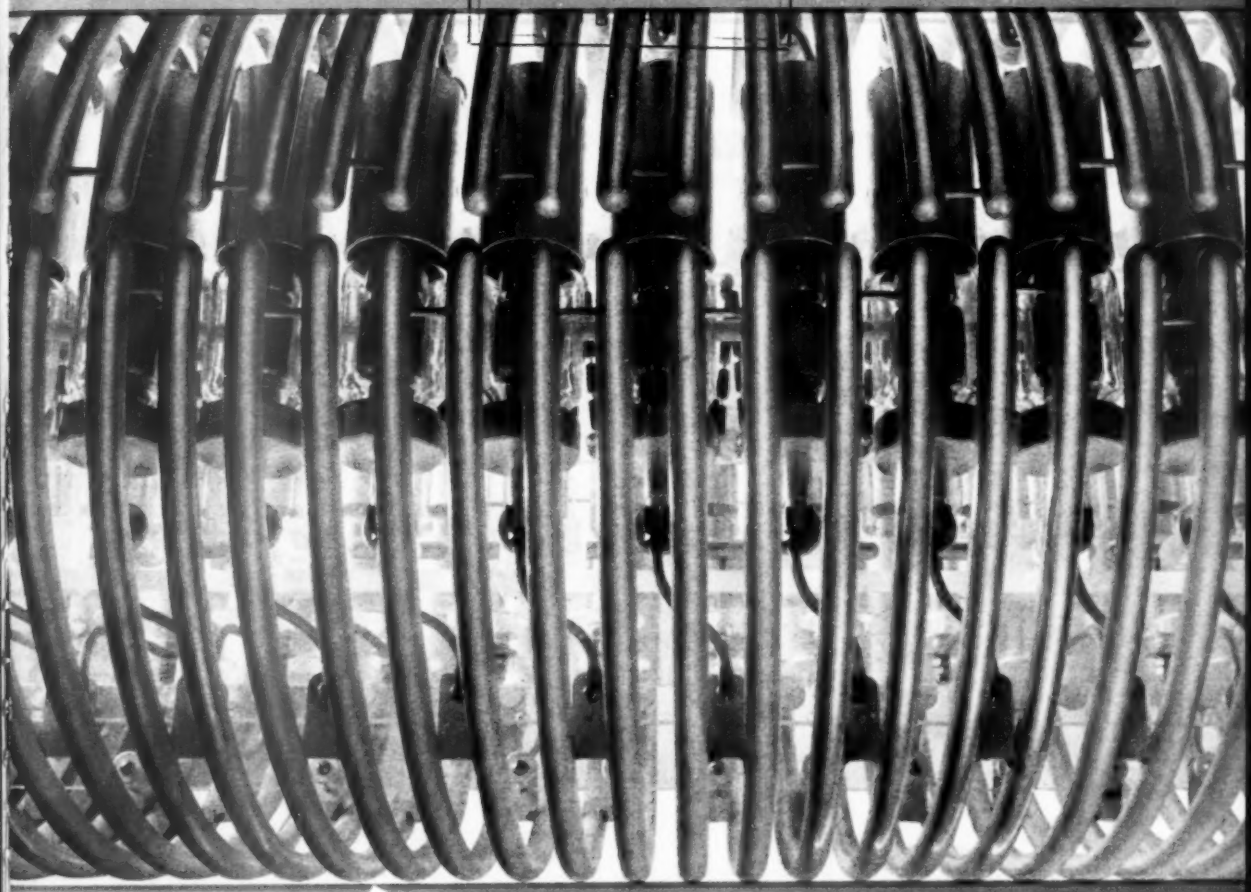
THE WEEKLY SUMMARY OF CURRENT SCIENCE



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Accelerator Rings

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A SCIENCE SERVICE PUBLICATION

PIONEERING

AT BELL TELEPHONE LABORATORIES

In such an open field as this Dr. Karl Jansky of Bell Laboratories opened the way to radio astronomy. His search for a mysterious source of radio noise led him—and us—to the stars for our answer.

Today Bell scientists continue their pioneering in many fields—among them the transmission of human voices on beams of coherent light. Bell Laboratories' revolutionary Optical Maser foreshadows the use of light as a whole new medium of telephone, TV and data communications.

These are but two of the many fundamental advances which have come from breaking fresh ground at the world center of communications research and development.

MEDICINE

Virus Link to Cancer

Viruses have been shown to bind together cancer-causing materials in test tubes. Researchers believe viruses serve as carriers of the cancer agents, Faye Marley reports.

➤ A FRESH APPROACH to the cancer problem was offered to physicians attending the American Medical Association convention in New York in a report linking common human viruses with the disease.

Drs. Christopher M. Martin, Sigmundur Magnusson and two medical students, all of the Seton Hall College of Medicine in Jersey City, N. J., reported studies in mice that may possibly apply to cancers including leukemia (blood cancer), lymphomas (lymph-gland cancers) and fibrosarcomas (connective or scar-tissue cancers).

The researchers built on previous work done as early as 1944 in pioneer experiments at the Rockefeller Institute by Drs. Peyton Rous and W. F. Friedewald, and at Yale University by the late Dr. F. Duran-Reynals and by Mrs. M. L. Duran-Reynals.

The investigators injected mice with moderate doses of poliovirus type two, with vaccinia virus (used for smallpox vaccination), or two viruses causing a variety of grippe-like diseases—Coxsackie B-4 and ECHO type-9—and found that they developed no significant disease.

Mice given very small doses of either of two cancer-causing compounds—9,10-dimethyl-1,2-benzanthracene (DMBA) and 2-amino-fluorene—developed neither disease nor tumors.

Then Dr. Martin and his colleagues tried giving the same doses of one of the viruses and one of the carcinogens with the result that a variety of cancers developed in the mice.

The next step was to immunize a group of mice against vaccinia virus, rendering them highly resistant to vaccinia infection. They then compared the effect of injecting vaccinia virus plus DMBA into these protected mice and into non-immunized mice still susceptible to vaccinia, and found that cancers occurred only in the non-immunized, vaccinia-susceptible mice.

Dr. Martin said that by adding carcinogens tagged with radioactive carbon-14 atoms to solutions of highly concentrated, purified viruses, they were able to show that viruses bind minute quantities of carcinogens in the test tubes. The cancer-causing virus retains the ability to invade cells, which the researchers have interpreted to mean that common viruses can serve as carcinogen-vectors or carriers, and that specific immunity against the virus of a carcinogen-virus pair would protect against the development of tumors.

The carcinogen-vector concept, the researchers believe, deserves study in man, inasmuch as it introduces the possibility that some forms of cancer may be preventable through suppression of the carrier by virus vaccines.

Another cancer study was reported by Dr. Stephen Rothman of the University of Chicago and Argonne Cancer Research Hospital, which is operated for the Atomic Energy Commission by the University.

Visiting Uganda, East Africa, with 21 other physicians from all over the world who attended a symposium at Makerere College, Dr. Rothman found that a cancer rare in this country is 200 times more prevalent in the Congo, South Africa and other parts of Africa where the climate is consistently warm.

The disease, which accompanies poor circulation and shows up first as dark, bluish spots on the backs of the toes and fingers, is called Kaposi's sarcoma.

• Science News Letter, 80:19 July 8, 1961

DISEASE STAGES—Various stages of rheumatoid spondylitis are demonstrated with a skeleton by Dr. John Sigler, Detroit, at an exhibit at the American Medical Association meeting in New York.

Hepatitis Vaccine Seen

➤ FOUR YEARS of prison life have not been wasted for some 175 men at the Illinois State Penitentiary, Joliet. Their contribution toward a vaccine for infectious hepatitis was announced at the American Medical Association meeting in New York by Dr. Joseph D. Boggs of Children's Memorial Hospital, Chicago.

Dr. Boggs' investigation was done in cooperation with research scientists at Parke, Davis & Co. laboratories, Detroit, who had first reported isolation of virus-like agents from the blood of patients with infectious hepatitis in 1956.

But research was slowed up by the fact that it was impossible to reproduce the disease in any laboratory animal. The viruses would grow successfully only in human cell cultures.

These cultured viruses produce hepatitis when introduced into human beings, who in turn produce antibodies against the virus administered.

Dr. Boggs said that although there is now definite proof that hepatitis viruses have been tracked down and isolated, production of a safe, effective vaccine now awaits additional study and evaluation.

Studies of reactions in the prison volunteers, none of whom suffered serious after-effects, showed that hepatitis virus probably occurs in at least three distinct types, at least two of which are capable of producing the disease.

The virus was given by injection in a single dose, with potency and size of dose varied. The volunteers, all of whom were healthy when injected, and who had no previous history of liver abnormality or hepatitis that might have built up immunity, were divided into several groups.

Hepatitis developed in 30 days among those who received high concentrations of virus. Groups that received less potent virus developed antibodies to the virus without disease.

With infectious hepatitis becoming one of the most serious communicable disease problems in the country (twice as many cases were reported during the first 18 weeks of 1961 as compared to the same period in 1960), public health authorities hope for confirmation of the breakthrough in research that may stamp out the scourge.

• Science News Letter, 80:19 July 8, 1961

Report on Heart Disease

Also reported at the AMA symposium on new approaches in the treatment of acquired heart disease was the discovery that some enzymes (proteins that act as catalysts in the chemical processes of the body), called isoenzymes, may aid in the early diagnosis of disease.

"It may be possible at some future date for a family physician to record routinely the isoenzyme blood pattern of patients when they are well in order to provide a baseline or biochemical 'fingerprint' of them," Dr. Felix Wroblewski, Cornell Medical School and Sloan-Kettering Memorial Hospital, New York, said.

• Science News Letter, 80:19 July 8, 1961

MEDICINE

Swiss Anesthetic Used

➤ SURGEONS at the University of Michigan Medical Center in Ann Arbor are using a new general anesthetic that puts patients "out" in 15 seconds with a single intravenous injection, usually in the arm.

They report that the drug, called G-29, leaves patients free of unpleasant after-effects such as dizziness, nausea and depression. Recovery is prompt, and there is no "anesthetic hangover."

"The patients like it," said Dr. Gunter Corssen, assistant professor of anesthesiology at the University.

Dr. Corssen, in charge of the G-29 project, decided to use it at the University hospital after a visit last fall to the Swiss laboratories where it is made. M. J. Thuillier, a French chemist, developed the drug and first tested it on laboratory animals.

To date, it has been used for "a variety of short-lasting operations" on more than 300 patients. Physicians say it should not be used for major surgery of long duration, on persons with high blood pressure or certain glandular disturbances, or on addicts of alcohol, barbiturates and opiates.

A synthetic amide (an amide is an organic compound), G-29 is a milky, odorless oil. Two teaspoons of it will completely anesthetize a patient for eight minutes. The length of time the patient is "out" can be precisely controlled by varying the amount injected.

G-29 acts so fast that patients often do not realize they have been anesthetized until after the operation has been completed. They have been known to lose consciousness in the middle of a sentence, and complete what they started to say after they snap awake.

Recovery is quick because the chemical is rapidly broken down by the blood into water-soluble salt with no anesthetic property.

Dr. James B. Hayward, head of surgery at the center, said G-29 is particularly good for mouth operations, since it requires no obstructions such as masks to block the surgeon's field. Dr. Corssen said that in addition to oral surgery, G-29 is proving valuable for bone, eye, nose and throat operations.

The University is one of two places in the United States known to be using the new drug. The other is at Duke University, Durham, N. C.

A scientific exhibit on G-29 was on display at the annual American Medical Association meeting in New York.

• Science News Letter, 80:20 July 8, 1961

Emotional Ailments

➤ ASTHMA, bronchitis, emphysema and other pulmonary ailments as well as heart disability come to professional men who cannot cope with the stresses of middle age, the American Medical Association meeting was told in New York.

Of men between 45 and 55 in the executive and professional class who come to the doctor's office, 50% are involved in a pattern of emotional strain, Dr. John F. Briggs of the University of Minnesota, himself a calm 56, said.

"There is no intractable coronary disease," Dr. Briggs said, "only intractable people."

Men enter their fifties in a frenzied state not because they are passing through a male menopause comparable to the woman's climacteric, he believes. The frenzied fifties are a cumulative result of the emotional pattern of the "twirling twenties," the "thirsty thirties," and the "foolish forties."

There should be greater emphasis on teaching mental health in the schools before youngsters build up tensions, Dr. Briggs believes. He advised using a scheme weighing one's individual assets and liabilities early in life to avoid frustration later.

Status seekers would do better to accept their liabilities and adjust with their assets, he said.

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Cancer Treatment

➤ METHOTREXATE, the widely heralded drug reported successful for treatment of choriocarcinoma, a rare form of cancer associated with pregnancy, should not be used for treating related cancerous diseases, according to a group of surgeons at the Mayo Clinic, Rochester, Minn.

Dr. R. B. Wilson graphically demonstrated the difference in two other cancers from the placental cells (trophoblastic tissue) in an exhibit at the American Medical Association convention in New York.

"Surgery, or X-ray treatment, in cases where surgery cannot be performed, is preferable in treating chorio-adenoma destruens," Dr. Wilson told SCIENCE SERVICE. Although some physicians are experimenting with methotrexate and other drugs in treating this type of cancer, he believes chemotherapy is inadvisable and unnecessary.

Another type of tumor caused by placental cells, Dr. Wilson said, is the hydatidiform mole, a grapelike growth within the uterus that makes normal development of the fetus impossible. These grapelike growths should be removed.

Among the hundreds of other scientific and pharmaceutical exhibits shown at the meeting were those related to diabetes, to mental disease, to heart ailments, arthritis and numerous other illnesses that plague modern man.

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Itchy Skin Condition

➤ LIVING CONSTANTLY in air-conditioned places can cause a skin condition resembling the "winter itch" resulting from wearing red flannel underwear, the American Medical Association meeting was told in New York.

Dr. Marvin E. Chernosky of Houston, Texas, said he had treated 18 patients with this skin disease during the past three summers. The 18 literally "run from one air-conditioned place to another," and even their cars are air-conditioned.

The skin condition results because the skin dries out in air-conditioned places due to lower humidity. Although the increased comfort and beneficial effects of air conditioning outweigh adverse effects, Dr. Chernosky said its widespread use is causing a change in the seasonal incidence of diseases.

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MILITARY SCIENCE

"Audit" System Proposed

➤ A SYSTEM for monitoring underground nuclear blasts—called AUDIT, for Automatic Unattended Detection Inspection Transmitter—was presented at the National Convention on Military Electronics in Washington, D. C.

Its backers said AUDIT is designed to meet Russian demands that nuclear test bans be enforced without permitting foreign detection and inspection teams to invade Soviet privacy.

The AUDIT concept calls for "a substantial number" of monitoring stations, unattended and visited only rarely for maintenance or replacement, inside Soviet territory. Receiving stations would be established in friendly or neutral countries.

The stations would have to be small (1,000 to 2,000 pounds) and truck-transportable. They would operate from self-contained, long-life power sources, possibly using solar energy. They would have to be "tamper-proof and spoof-proof."

"One may think of the AUDIT station as a combination receiver, computer and transmitter," said Clark C. Abt, preliminary systems manager for the missile and space division of the Raytheon Company, Bedford, Mass.

Problems to be met, he said, include making sure the station will receive a signal from a low-yield underground burst, will be able to determine that the signal is not from an earthquake or a chemical explosion, and will have enough power to pass the message to the next relay receiver.

A system that will detect even the smallest bursts must combine and correlate both high-frequency seismic signals and low-frequency electromagnetic signals, he believes. More detailed knowledge of "the amplitude, frequency and duration" of electromagnetic signals from underground nuclear blasts would first be needed.

Weak links in the usual type of relay system reportedly could be eliminated by a "chain-reaction" communications network. Each station would be "equally capable of forming multiple links in the chain," so that communications would not be disrupted even if several stations were removed.

Mr. Abt said a "new and unique" coding technique, allowing chain-reaction signaling without interference, has been developed by Raytheon. Low-frequency ground wave propagation is used.

Each station in the chain would require only enough power to reach the four stations nearest to it. Only a few simple signals would have to be transmitted.

Initial cost per station is estimated at $500,000, including seismic and electromagnetic sensors, electronic data processing and communications equipment, power supply, a tamper warning device, construction and packaging. On this basis, a network of 3,000 stations would cost one and a half billion dollars.

Mr. Abt said the system cost by countries and geographic regions should be estimated and used as "a basis for determining the global political and economic feasibility" of the proposal.

• Science News Letter, 80:21 July 8, 1961

SPACE

TV for Astronaut Training

➤ A TRAINING device for future astronauts was proposed at the National Convention on Military Electronics in Washington, D. C. It is a closed-circuit television system that would duplicate, as closely as possible, the visual environment of outer space.

The project presented by T. F. Buddenhagen of Bell Aerosystems Company, Buffalo, N. Y., involves a large training "theater" with three high-intensity projectors and three screens.

The trainee would be placed in a model control room behind a mockup of the space vehicle, near the center of the "theater." There he would see televised images of the earth, the planets, the stars, the moon and the sun—realistically lit and in their proper geometric relationships—as they would appear during an actual flight.

One studio would generate the basic picture of the star field. A second would use a turning globe to show the earth as it appears from high altitudes, with a battery of spotlights for the imitation "sun." The third studio would show a space station model for simulation of orbital rendezvous conditions. Different models could be used in simulated flights covering approaches to the moon, earth and other planets.

The relative motions of all the bodies concerned would be coordinated and synchronized in the composite picture. New camera tubes and circuitry systems must be developed before all simulation requirements are met, Mr. Buddenhagen said.

Since actual space vehicles are not available for training missions, he pointed out, simulation facilities are important in determining control systems and "tasks which may be reasonably assigned" for manned space flight.

Manned vehicles are expected to have windows for "visual communication with the external environment," despite the extra weight. Periscopes and television viewing systems also may be used. Manned craft may have a front window, possibly covered with a heat shield until the high-temperature portion of re-entry is passed, and one or two side windows, kept shuttered or heavily filtered.

The astronaut must avoid looking at the sun, Mr. Buddenhagen said. Because the sun's light is not diffused by the atmosphere, it remains directional and there will be no warning that the sun is near the visual field. For this reason, the astronaut will probably open a window shutter only when he desires to look out.

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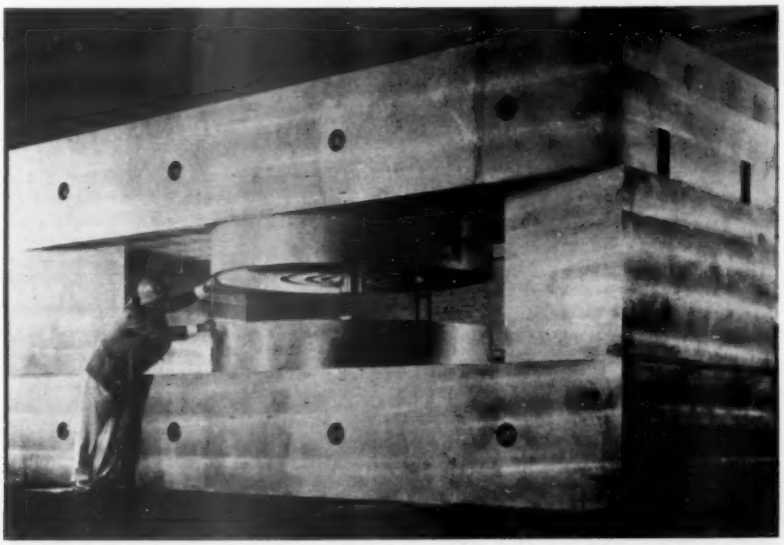

GIANT MAGNET—A 275-ton steel electromagnet, produced by the United States Steel Corporation, Pittsburgh, Pa., will be part of an 88-inch cyclotron under construction at the University of California's Lawrence Radiation Laboratory. The magnet, financed by the Atomic Energy Commission, will control the acceleration of some million billion atomic particles per second and permit nuclear experiments not possible before.

MEDICINE

Arthritis and Weather

➤ ARTHRITIS VICTIMS who believe changes in the weather affect their condition may have a surprise coming.

Studies of 10 patients who spent a total of 242 patient-days in a controlled climate chamber disclosed no single weather factor that made their arthritis better or worse.

The three physicians in charge of the experiment told the American Rheumatism Association in New York they still believe climatic factors have some bearing on rheumatoid arthritis. But first findings from their proposed long-range study showed no consistent effect on arthritic symptoms.

Drs. Joseph Lee Hollander, Ronald A. Restifo and Hugo J. Fort placed their subjects in a $125,000 "climatron" at the University of Pennsylvania Hospital in Philadelphia. Dials and switches can change the temperature, humidity, pressure, air movement and electrical charge inside the sealed chamber. The two patients inside also see natural weather conditions through heavy plate glass windows.

The patients were not told about the nature of the test or the artificially controlled climatic changes.

They have kept diaries noting body weight, body temperature, number of aspirin tablets taken, and time of any improvement or worsening of symptoms. They were also checked at least once daily by experienced rheumatologists for joint stiffness, tenderness, strength of hand grip and other relevant signs.

The patients have easily detected changes in the degree of their general comfort from marked weather variations, the team reported. Chilling made some of them note increased stiffness. But so far, neither the artificial weather inside nor the "real" weather outside has materially affected their arthritis.

Many arthritics claim they feel increasing joint pain in wet weather. A hot, dry climate supposedly improves their condition.

• Science News Letter, 80:22 July 8, 1961

New Drug Helpful

➤ A NEW DRUG named oxyphenbutazone, on the market only a few months, was reported to have had good effects on rheumatoid arthritis, fibrositis and bursitis patients.

The drug was also shown to produce fewer undesirable side effects than its forerunner and close chemical relative, phenylbutazone, when given to arthritics.

Dr. Irving L. Sperling, Maplewood, N. J., reported to the American Rheumatism Association meeting in New York on his three-year study of the effects of oxyphenbutazone on 1,003 patients suffering from varied rheumatic disorders.

Response to the newer drug was good, he said, among 70% of rheumatoid arthritis patients, compared with the 44% of similar cases showing good response in an earlier study of the effects of phenylbutazone. Harmful side effects such as skin rashes, gastrointestinal upsets and water retention occurred in 6.4% of arthritics treated with oxyphenbutazone, compared with 29.5% of those treated with phenylbutazone.

Dr. Sperling also described oxyphenbutazone as "a therapeutic agent of extreme value" for acute disorders other than rheumatoid arthritis, including fibrositis, tendonitis and bursitis.

Both drugs are produced by the pharmaceutical division of Geigy Chemical Corporation, Yonkers, N. Y.

• Science News Letter, 80:22 July 8, 1961

Aspirin Fouls Diagnosis

➤ A LITTLE-KNOWN side effect of aspirin can lead to a faulty diagnosis of gout in some patients with joint pains, physicians attending the annual American Rheumatism Association meeting in New York were told.

Three scientists from the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md., described two cases of rheumatoid arthritis mistakenly diagnosed as gout because of high levels of uric acid in their blood, a characteristic of gout. The patients were referred to the Institute after failing to respond to colchicine, the standard gout remedy.

Dr. A. I. Grayzel, Dr. J. E. Seegmiller and Lois Liddle found that the uric acid (serum urate) levels had been caused by low doses of aspirin taken to relieve joint pain, rather than by gout.

Studies show that low doses of acetylsalicylic acid, or aspirin, probably act by blocking secretion of urate by the kidneys. The urate then accumulates in the blood in abnormally high levels. Large doses of aspirin have the opposite effect, increasing urate elimination and lowering the uric acid level.

The team said another compound, acetaminophen, similar to aspirin in its pain-reducing effects, should be taken by gout patients in preference to aspirin.

• Science News Letter, 80:22 July 8, 1961

Treatment Clue

➤ PROMISING results in treating rheumatic disorders of a small group of patients with epsilon amino caproic acid, or EACA, have been reported.

Dr. Jerome Rotstein of Montefiore Hospital in New York found this important research clue for the study of connective tissue diseases, of which rheumatoid arthritis is the most severe.

EACA was first synthesized by German chemists in 1907, and in 1953 Japanese scientists reported that it had potential use in control of acute bleeding conditions associated with high plasmin levels. It was this factor that led Dr. Rotstein and his colleagues to undertake exploratory studies for its possible use in treating connective tissue diseases.

No conclusive results have been shown yet in the treatment of rheumatoid arthritis, but progressive systemic sclerosis, a severe connective tissue disease, has responded to the compound.

EACA acts on an enzyme system, which is the fibrinolytic system believed to be involved in the mechanism of inflammation. It blocks the activation of plasminogen into plasmin, which reduces fibrin, an insoluble gel form of fibrinogen that occurs during the clotting of blood.

When fibrin is split up (fibrinolysis), the remaining fibrin products are believed to be involved in the development of fibrinoid lesions present in arthritis and in other inflammatory lesions.

Lederle Laboratories at Pearl River, N.Y., has been doing development work on EACA, but there is no prospect of its commercial production at this time.

Dr. Rotstein, who reported the findings at the annual meeting of the American Rheumatism Association in New York, was assisted in his research by Drs. Irving Estrin and Charles Dennert, also of Montefiore Hospital.

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PSYCHOLOGY

Sleepers Motivated To Tell Sounds Apart

➤ MONEY TALKS, even in your sleep. With sufficient motivation—in this case, extra payment—a sleeping person can tell the difference between such similar sounds as the telephone and the doorbell, researchers at the University of Texas Medical Branch, Galveston, have found.

Dr. W. P. Wilson and William W. K. Zung reported in the Archives of General Psychiatry, June, 1961, published by the American Medical Association, that the sleepers' powers of discrimination were decreased, however, in the deepest stages of sleep.

The researchers subjected 25 normal male volunteers to a variety of familiar and unfamiliar sounds during the various stages of sleep to determine their ability to discriminate in this state. Familiar sounds included cars starting and stopping, door chimes, trains, clock striking, telephone ringing, airplanes flying, sirens, rain storms, door bells and motorcycles.

Unfamiliar sounds included Chinese gongs, artillery gunfire, lion roars, monkey howls, fox hunts and antiaircraft guns. All of the sounds were produced at the same noise level.

The subjects responded to noise more frequently when they were in the lighter stages of sleep. They responded in the same manner to the familiar sounds as they did to the unusual sounds.

Some of the subjects were told that if they awakened completely each time they heard either a telephone ring or bagpipes playing, they would receive extra payment for the achievement.

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OCEANOGRAPHY

Split Bottom Lowers Seas

➤ THE OCEAN BOTTOM has opened up during the last 20,000,000 years, swallowing billions of gallons of water and lowering the level of the oceans at least 1,500 feet.

Huge cracks cutting across ocean bottoms have slowly, though steadily, been widening since Miocene time leaving a gap for the ocean waters to fill in. The huge fissures (rift zones) were formed on top of ridges thrusting upward from the ocean deeps.

Available data show that the rift zones probably widened about 90 miles, dropping the ocean level about 1,500 feet, Dr. John D. Weaver of the University of Puerto Rico's Institute of Caribbean Studies, Mayaguez, reports in Nature, 190:1186, 1961. A rift zone near Iceland is now widening about 20 feet a mile every 1,000 years, the scientist states.

The earth is constantly expanding, opening up new rifts and widening older ones as part of its "growing pains," Dr. Weaver reports.

Distinct terraces on Caribbean islands that match those on the South American coast provide evidence of former ocean bottom left high and dry when the water receded. It is very unlikely that the similar levels of these marine terraces are merely accidental, he emphasized.

Many scientists believe the movement of the huge underwater blocks of rock are caused by warm currents circulating within the rock masses underlying the soft veneer of ocean bottom sediments. The heat, caused by radioactivity, probably formed the Mid-Atlantic Ridge whose backbone divides the Atlantic Ocean bottom.

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ARCHAEOLOGY

Early Living Sites Found

➤ ONCE SETTLED living places indicating the stage between hunting and agricultural life of prehistoric man have been found in Iran by a team of U. S. scientists.

Articles discarded at these "village" sites by men living from about 100,000 to 5,000 years ago were found by Dr. Robert J. Braidwood, anthropologist of the University of Chicago, Dr. Bruce Howe, archaeologist at the Peabody Museum, Harvard University, and Dr. Charles A. Reed, zoologist at the University of Illinois, Chicago.

The three scientists spent a year in the Zagros Mountains of Iran looking for the earliest evidence of the time and place when man first began producing his own food, instead of relying solely on hunting, fishing and gathering.

The team found much evidence to suggest that sometime between 15,000 and 8,000 years ago the swing to farming and village living took place. At one small, low mound called Asiab, believed dated between 11,000 and 9,000 years ago, the team made an exceptional find of coprolites, or fossil dung. If the coprolites are found to be human, as the scientists think they may be, they would show the diet of community members, who were then living a somewhat settled life, quite likely a stage leading to an agricultural society.

At another site, called Sarab, many objects, such as pottery, clay figurines and ground stone work, were found to resemble those from Jarmo, an ancient farming community in Iraqi Kurdistan.

Semi-pit structures used in Sarab may originally have been covered with reed roofs. Apparently this was not a permanent living place, and there is so far not any evidence of cereals such as wheat or barley.

However, many animal bones and other evidence suggest the domestication of goats in this community believed to have been lived in about 9,000 to 8,000 years ago.

The scientists, who have just begun evaluating their finds, report their work in Science, 133:2008, 1961.

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WOOD-CARVED MASKS—Exhibit case, designed by Anthony Distefano, holds masks from an Aleut burial cave (Alaska) as part of the new hall of North American Archaeology at the Smithsonian Institution.

MINERALOGY

Rare Mineral Found In Man-made Diamonds

➤ A RARE MINERAL occurring naturally only in meteor craters has been discovered in a man-made diamond.

Coesite, a quartz mineral that forms under tremendous pressures, was found trapped within a diamond created artificially in the General Electric Laboratories, Schenectady, N. Y. A high-pressure shock wave, probably equal to that which formed the mineral when a meteor slammed into the earth, created the coesite in the laboratory diamond experiment.

"Some X-ray photographs of natural diamonds indicate the possible presence of coesite," Dr. H. Judith Milledge, University College chemist, London, reported in Nature, 190:1181, 1961. "If substantiated, this would represent the first natural occurrence of coesite except in meteor craters."

The identification of coesite in artificial diamonds strongly supports the geological view that the quartz sometimes found in natural diamonds had to be formed after the diamond crystallized.

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ARCHAEOLOGY

Smithsonian Opens Hall Of North American Relics

➤ A MODERNIZED HALL of North American archaeology that gives a better display of the Smithsonian Institution's ancient treasures has been opened in Washington, D. C.

The hall contains exhibits and specimens from the Southwest, California and Alaska, including silver and other metal trade goods, glass beads and bottles used by Indians. Material from Indian mines and quarries, such as obsidian, flint and turquoise, as well as a map that locates the mining sites are included.

A second hall to supplement the one now open is scheduled for completion in about a year. In this hall, material from the eastern United States, the Southeast, including Florida, and the Great Plains states will be displayed, including the methods and objectives of archaeology.

• Science News Letter, 80:23 July 8, 1961

GERONTOLOGY

Age Seen No Handicap in Manpower-Short Areas

➤ AGE IS NO HANDICAP if a person is prepared to work in areas where manpower shortages exist, but traditional opinions need to be changed to allow oldsters to get useful jobs.

There are and will continue to be shortages of teachers, social service workers and hospital workers, Matthew Radom of Rutgers University, New Brunswick, N. J., told the American Geriatrics Society meeting in New York.

Teachers' colleges should be working on programs to prepare men and women to be part-time teachers in fields in which they have already worked.

"These could range from visiting lecturers at universities to manual training in elementary schools," Mr. Radom said.

"To the greatest extent possible, all jobs should be paid ones. I propose that all older people who wish to work part-time be given the minimum wage established by law, regardless of type of work."

Charles E. Odell of the United Auto Workers, AFL-CIO, Detroit, advised the American worker to prepare himself for three or more career changes during his lifetime.

Paid employment for large numbers of persons past 65 years of age is hard to foresee, Mr. Odell pointed out, especially during a chronic unemployment period in which six percent or more of the American work force is affected.

An economic climate of full employment is needed, Mr. Odell said. Contrary to popular opinion, he noted, "most unions have stood for the elimination of mandatory retirement along with earlier disability retirement."

• Science News Letter, 80:24 July 8, 1961

NUTRITION

Study "Food for Peace" By Eating Some of It

➤ THE FULL FLAVOR of the Food for Peace program was disclosed to guests at a luncheon in Washington, D. C.

Delegates to the American Food for Peace Council's first national conference sat down in the Old Supreme Court Chamber in the capitol building to a noon snack consisting entirely of foodstuffs actually being sent overseas under the program, or being studied for possible inclusion in it.

The menu, worked out by caterers and Council officials, included the use of such established Food for Peace staples as corn meal and powdered milk.

Bulgor wheat, a newcomer to the program this year, was also served. Other treats for the 150 who attended were soybean milk and fish flour. Neither is in the program, but both are being considered.

Food for Peace Director George McGovern said bulgor wheat was chosen for distribution to replace rice, not currently in surplus. It can be boiled like rice, and has equivalent food values. The taste is more on the order of wild rice than domestic varieties.

Bulgor, common to Eastern Mediterranean areas, is processed from top-grade wheat. Only the outer fibers are discarded, leaving nutritional values high. In the United States, bulgor gets limited distribution through specialty groceries, and is served in Greek and Armenian restaurants.

The Department of Agriculture is now negotiating a processing contract for 100,000 bushels of American-grown surplus hard red wheat, destined for shipment abroad after it is "bulgorized."

Officials have high hopes for the future of flour made from ground dried fish, which can be deodorized. Two or three spoonfuls supply a full day's protein requirements for one person at a cost of about 15 cents a pound.

• Science News Letter, 80:24 July 8, 1961

IMMUNOLOGY

Time Ripe for Polio Epidemic in Atlanta

➤ THE TIME is ripe for a polio epidemic in Atlanta, Dr. Alan W. Donaldson, deputy chief, Communicable Disease Center, Atlanta, told SCIENCE SERVICE. But thanks to the one-dose inoculations of 300,000 children from six months through 14 years of age given in a crash program, the paralytic plague is expected to by-pass the city.

The preventive purposes that lie behind all public health work came to fruition in the laboratory of the CDC, where more than 100 stool specimens of children were found to harbor type III poliovirus along with other intestinal viruses.

In the meantime, Dr. Donaldson said, there were seven reported cases of polio among children under five, four of them paralytic. The cases occurred early for Atlanta, in March, April and May.

The evidence pointed to a possible epidemic because Atlanta had had no appreciable number of polio cases for ten years, which is time enough for children to become susceptible. An epidemic builds up antibodies for a time only.

Dr. Albert Sabin of Cincinnati, whose live oral poliovirus vaccine has been approved by the U. S. Public Health Service, contributed 300,000 doses of type III vaccine. The children were fed cubes of sugar on which the liquid vaccine was dropped. And this will be the end of type III polioviruses.

But there are two other types of poliovirus, type one and type two, which can be stamped out with Salk vaccine. So the majority of the Atlanta population under 40 will receive the killed vaccine. The children who have had the Sabin vaccine will be doubly or triply protected with Salk inoculations.

Originally it had been planned to have a much smaller immunization program for two housing centers in the center of Atlanta, and it was pre-vaccination "baseline tests" that uncovered the danger of a widespread epidemic that could reach anywhere from 200 to 600 cases.

• Science News Letter, 80:24 July 8, 1961

IN SCIENCE

TECHNOLOGY

Normal Metals Used As Superconductors

➤ NORMAL METALS can be made to act as superconductors and to do so at specific, very low temperatures, four scientists report.

Superconductors are metals having the ability to conduct electric currents seemingly indefinitely when cooled to temperatures near absolute zero, which is 459.7 degrees below zero Fahrenheit. Only certain metals become superconducting.

But now scientists at Arthur D. Little, Inc., have found that a thin film of a normal metal not naturally a superconductor can be made to act as one when it is in contact with a superconducting metal film at the proper temperature. The assembly of the two metals in contact behaves as a unit having superconducting properties of its own.

The discovery raises the possibility that electronic design engineers may one day have available to them new superconducting materials and new methods of controlling the performance of these materials.

Superconductors have recently begun to play an important role in advanced electronic circuits where they can take the place of vacuum tubes or transistors for certain functions. The discovery that electrons tunnel through a thin dielectric between superconducting metals increased the range of possible uses.

Research results on superconducting films of "normal" metals are reported in the Physical Review Letters, 6:686, 1961, by Drs. Paul H. Smith, Sidney Shapiro, John L. Miles and James Nicol of A. D. Little's Cambridge, Mass., laboratories.

• Science News Letter, 80:24 July 8, 1961

SOCIOLOGY

Science Progress Alone No Assurance of Peace

➤ SCIENTIFIC TECHNIQUES and concepts are not enough to enable mankind to "breed out of the race the age-old desire for mutual destruction," Dr. Alan T. Waterman, National Science Foundation director, believes.

The growth of humanitarianism and individual maturity must accompany scientific progress if lasting peace is to be achieved, Dr. Waterman told Norwich University graduates at commencement exercises in Northfield, Vt.

"Science can only point out the possibilities which are within our grasp," he said. "Decisions to make these possibilities realities must come from society itself and, in particular, from the voter and his duly elected representatives."

• Science News Letter, 80:24 July 8, 1961

NCE FIELDS

ENTOMOLOGY

Malaria Mosquito's Hide-Out Found

➤ THE MOSQUITOES that carry most of the malaria in tropical Africa have stubbornly thwarted eradication attempts for years, but entomologists now believe they have found a way to spray them out of existence.

In most cases, malaria-carrying mosquitoes rest within the house of their victims after taking a blood meal. If the house is properly sprayed with insecticide, the resting mosquito usually picks up a deadly dose of poison and does not live long enough to bite again.

But *Anopheles gambiae*, the main peddler of malaria in Africa, does not normally rest in houses, research has shown.

Studies directed by Dr. A. Smith, Tropical Pesticides Research Institute, Arusha, Tanganyika, showed that this particular mosquito rests in dense patches of salt bush during the wet season from November to May. During the dry season from June to October, the salt bush loses much of its foliage and the mosquito takes to the crevices that open up in the hard ground.

Only if the salt bush is cut down during the wet season will the mosquitoes rest in artificial shelters such as trap boxes and houses, Dr. Smith reports in Nature, 190:1220, 1961. His findings indicate that spraying bushes and crevices will be more effective than spraying houses.

• Science News Letter, 80:25 July 8, 1961

PUBLIC HEALTH

Need Nationwide Attack To Check Food Poisoning

➤ A NATIONWIDE ATTACK is needed to control food poisoning cases, estimated at half a million to a million cases a year.

"It must be something I ate" typifies the public apathy of shrugging off the continued problem of food-borne infections, Dr. Leon Buchbinder of the New York City Department of Health writes in Public Health Reports, 76:515, 1961, published by the U.S. Public Health Service, Washington, D. C.

Sanitary control programs for water and milk have far outdistanced those for food, Dr. Buchbinder said, pointing out that support for such programs had been relatively easy to obtain because death or severe illness were known to result from infection from impure supplies.

The food control story is quite different, he said. Most food poisoning today is usually relatively mild, with deaths very rare. Usually adults are affected, and headlines carry no scare about dangers to children.

The bacteria mainly responsible for food poisoning are no less prevalent or less virulent today than they have been in the recent past. These include the staphylococci, enterococci, *Salmonella* species and *Clostridium welchii*.

Dr. Buchbinder said equipment of proper sanitary design is available and in fairly widespread use. The Public Health Service ordinance for restaurant food service and the efforts of the National Sanitation Foundation have been helpful.

However, research in food control has been fragmentary and should be coordinated. Dr. Buchbinder recommended the formation of a national study committee.

• Science News Letter, 80:25 July 8, 1961

EDUCATION

Science Training Needed From Kindergarten On

➤ SCIENCE EDUCATION should start in kindergarten.

Schools have a responsibility to provide children with "an orderly intellectual experience" in science studies, included as "a regularly scheduled part of the curriculum in all grades," the American Association for the Advancement of Science believes.

A study report by the association calls for a ten-year sequence of coordinated science instruction, from kindergarten through the ninth grade, as part of a program to improve science and mathematics teaching at the elementary and junior high school levels.

No attempt should be made to develop a single program fitting all school systems, the AAAS said. Subjects and orders of progression should be chosen to meet existing situations.

Early scientific training is important, they said, because children form "their basic attitudes, patterns of thinking and modes of behavior" during early years. All persons should be equipped "for life in a scientific and technological society."

At the elementary level, teaching should have "flexibility and variety," without being limited to single disciplines such as biology, chemistry or physics. Basic ideas drawing on all sciences for examples should be presented within "a well-defined structure." Emphasis should be on "the spirit of discovery," rather than memorization of facts.

By the time he enters the tenth grade, the student should have a working knowledge of such aspects of science as "the distinction between operational definitions and theoretical definitions, the relationship between speculation and observation, and the displacement of one theory by another."

New course materials must be developed and new teacher training methods evolved, the report stressed. A national steering committee to direct the necessary planning was recommended. It would be composed of scientists, educators, learning specialists, teachers and supervisors.

The report, an outgrowth of conferences this year at Washington, St. Louis, and Berkeley, Calif., is published in Science, 133:2019, 1961. The National Science Foundation sponsored the study.

• Science News Letter, 80:25 July 8, 1961

MEDICINE

Have Few Children Following Adoptions

➤ THE OLD WIVES' TALE that women who adopt children immediately become pregnant was shown up for what it is by Dr. A. Lawrence Banks, obstetrician and gynecologist of Seattle, Wash.

Only two percent of 100 adopting women queried became pregnant, acording to replies to a questionnaire from Dr. Banks, the North American Conference on Infertility in New York was told.

Ninety-four of the adopting parents replied in detail to Dr. Banks' questionnaire. Four became pregnant within a period of two to 22 months, he said, but after interviews with the four physicians who had taken care of the couples, he decided that only two pregnancies could be attributed to an emotional change.

Dr. Banks said he planned to publish additional findings from research he had done on 31 of his private patients in Seattle.

"Only one of the 31 patients who have adopted children has since become pregnant and this occurred five years after the adoption, which indicates no emotional connection."

Dr. Banks said in a random population of persons having difficulty in producing children, ten percent would be expected to have babies without treatment before the wives reached menopause.

Dr. Banks also participated in a panel discussion of the psychiatric aspects of infertility, in which he emphasized the part of the husband in failing to become fertile because of emotional factors.

"Perhaps the time has come for a single standard of examination for husbands and wives to determine why they appear unable to have children," he said. "There are fewer frigid wives than most persons think. At least half of the time, it is the husband whose emotional problems prevent the couple from having children."

• Science News Letter, 80:25 July 8, 1961

MINERALOGY

Five New Minerals Found in One Spot

➤ FIVE NEW MINERALS have been found near a small town in the Sierra Madre Mountains, Mexico.

This unusually rare find of so many minerals in one locality at one time is reported in Science, 133:2017, 1961, by Drs. Joseph A. Mandarino of the Royal Ontario Museum, Toronto, and Scott J. Williams, Scott Williams Mineral Company, Scottsdale, Ariz.

The new minerals, still unnamed, were found in a tellurium deposit near Moctezuma, Sonora, Mexico, and are compounds of lead, zinc, manganese, manganese-zinc, and iron.

Although about 30 new minerals are found each year throughout the world it is very rare to find more than one in one spot.

• Science News Letter, 80:25 July 8, 1961

DENTISTRY

Tooth Decay Discoveries

Armed with a clearer picture of the enemy, provided by studies of germfree animals, dentists are now using new approaches, Gloria Ball reports.

➤ SCIENCE IS AT LAST on the right path for solving the age-old problem of tooth decay.

Decay will not occur unless specific bacteria are present. This the experimenters have demonstrated by observing rats that have never been allowed to be contaminated by germs.

Heretofore dentists were battling an unknown enemy, trying to prevent an elusive agent from destroying teeth. The leading suspects were heredity, diet and mouth bacteria, some 50 species of which have been found in human saliva.

The first definite clue appeared when scientists at the University of Notre Dame's Lobund Institute discovered that tooth decay does not occur unless bacteria are present. They fed germfree rats a diet that produces ruinous tooth decay in most normal rats. The germfree rats showed no decay.

Scientists at the National Institute of Dental Research borrowed some of the rats, repeated the experiment and got the same results. No bacteria, no decay. Even when food became tightly packed around the teeth and caused splitting, there was no decay.

Which Bacteria Cause Decay?

The question then was: Which one of the bacteria normally found in the mouth causes the decay?

Two such organisms were found in the rat. Both are streptococci. One is a true enterococcus; the other lies somewhere between an enteric and a lactic strain.

In studies with a line of hamsters that had been free of tooth decay for generations, five more strains of decay-producing streptococci were found. The five together were more destructive than any one alone. In many cases it took the bacteria a long time to produce decay.

But the evidence was irrevocable—tooth decay is infectious and transmissible, and bacteria are the cause.

Like any organism, however, the bacteria find it difficult to prosper and do their work, that of decaying teeth, unless they get enough to eat. Thus a diet high in carbohydrates is an important factor in decay.

There is still a mountain of detective work to be done. Although seven different kinds of bacteria, not one of which is familiar to bacteriologists, have been established as decay producers, it cannot be assumed that the same seven cause decay in man. The fact that one of the rat streptococci has been found incapable of producing decay in the hamster indicates that each species has its own set of enemies.

Since man is not an experimental animal, researchers will have to use a roundabout approach in finding decay producers. To do so, they must first find out what the dangerous bacteria have in common or what peculiar factor allows them to damage teeth.

Presumably, time will separate the innocent bacteria from the guilty, and researchers will be able to name specific organisms that cause decay in the human mouth.

There are two general lines of attack on tooth decay:

The first line of attack involves some rather tricky problems. The strep strains from the rat and the hamster can be knocked out with penicillin and other broad spectrum antibiotics. But such drugs are unsuitable not only because many persons may develop allergic reactions to them but also because they kill off all the other bacteria. This allows other organisms such as yeast and fungi to run rampant. They may cause serious lung ailments, for example, and can cause death.

Perhaps the best antibiotic approach is to use one which has a narrow spectrum of action, kills only the decay-producing bacteria. Even so, there is always the danger that decay strains will become resistant.

There is another approach—the use of chemicals that interfere with the metabolism of the bacteria. Minute amounts of carbonyl-binding compounds have cut tooth decay by as much as 86% when placed in rat food.

The second line of attack on dental decay, that of toughening the tooth, is already in progress. Nearly 40,000,000 Americans are now drinking fluoridated water, the value of which is no longer debated among dental scientists.

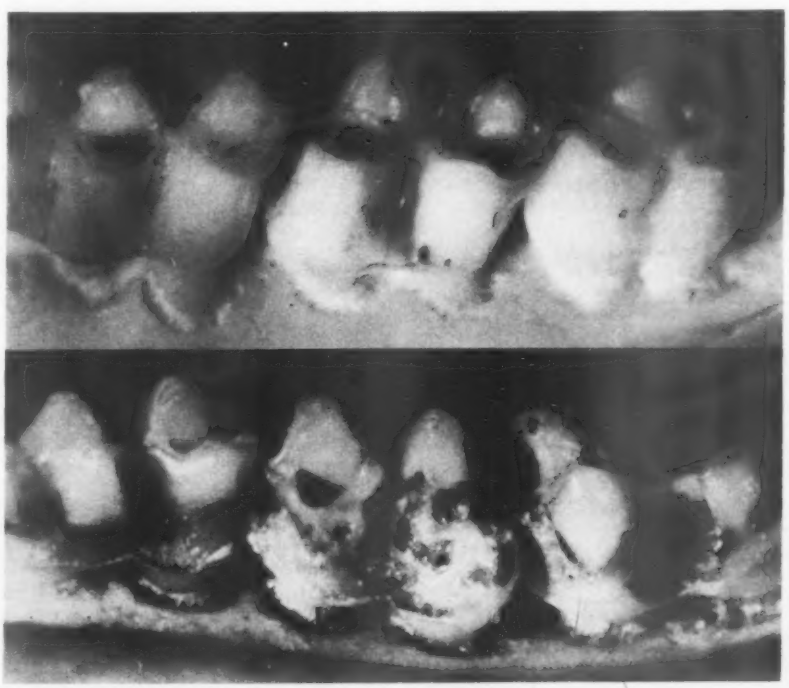
Fluoridation Recommended

The 1960 report of the 16-member Commission on the Survey of Dentistry in the United States said:

"Fluoridation is convenient, inexpensive (about eight cents per person per year, including amortization of equipment), and absolutely safe. In every locality where it has been installed, the tooth decay rate has been reduced by at least 50%, in some places by nearly 60%."

With more than three-fourths of the population still unprotected by fluoride, scientists at the National Institute for Dental Research are studying another approach that can reach even more persons —phosphated bread.

Mineral phosphates, particularly dibasic



STREPTOCOCCI AT WORK—Cavity-free teeth of a hamster (top). After inoculation with decay-producing streptococci, teeth show extensive decay (bottom).

calcium phosphate, drastically reduce tooth decay in rats, and by 1962 dental researchers will know whether it works just as well on humans. At that time, the first three-year period in their study of phosphate-fed children in North and South Dakota will begin to yield some results. If the technique works, bakers and cake-mix manufacturers will be urged to include more of the phosphates in their products.

Despite the fact that tooth decay afflicts 95% of the United States population, tooth decay is not the major cause of tooth loss among adults.

Periodontal disease, also known as gum disease, gingivitis or pyorrhea, causes more tooth loss in adults than all other causes combined.

It is an insidious disease that gets its start when the gums become inflamed and swell away from teeth. Small open pockets form between tooth and gum; bacteria collect in these pockets and produce toxins that eat away the fine filaments that connect the tooth to gum and bone. The tooth foundation is weakened and eventually the tooth is lost.

Bacteria may also enter the blood stream through this route.

For the most part periodontal disease is painless, and this is the biggest reason 22,000,000 Americans are toothless. The disease goes unnoticed and untreated.

Dentists now know that 50% of persons aged 50 have periodontal disease, and by age 65, the involvement is nearly 100%.

For many years, the tartar that forms on teeth has been suspected of causing lesions that give periodontal disease its start. And it was thought that bacteria were necessary for tartar formation.

But this is not true. Tartar can and does form in the mouths of germfree rats. Chemically and microscopically it is just like tartar from normal rats except that it has no bacteria trapped in it.

Many different methods of dissolving tartar from the teeth have been tried but anything that dissolves tartar also dissolves tooth enamel. At present, dentists treat and try to prevent periodontal disease by scraping the tartar off, teaching their patients how to brush their teeth properly and to keep their mouths reasonably clean. In cases of advanced disease, gum surgery is needed.

Dentistry has come a long way from the days when the suggested remedy for toothache, in the first century B.C., was to eat a whole mouse twice a month.

But in spite of anesthetics and high-speed drills, Americans, like people the world over, are still notorious cowards about facing the dentist.

• Science News Letter, 80:26 July 8, 1961

ZOOLOGY

Rare Lizard Caught Alive

➤ THE CAPTURE of an earless monitor lizard in West Borneo has given scientists their first opportunity to study the behavior of this elusive amphibious reptile, so rare that less than ten museum specimens are known to exist throughout the world.

The lizard lived about three months, during which time staff members of Sarawak Museum, Kuching, Borneo, made detailed round-the-clock observations and photographic records. It was found near the Great Caves of Niah, a center of intensive reptile collecting by museum field teams.

The lizard showed a marked capacity for relaxation, and "could literally collapse along the whole length of the body" when resting, Tom Harrisson and N. S. Haile of the Sarawak Museum report in Nature, 190:1213, 1961.

"A very good swimmer, it could relax on the bottom of a tank for up to half an hour."

This specimen of *Lanthonotus borneensis* Steindachner measured 13 inches, believed average size.

When first caught, it "played dead" and refused to eat. It later responded to raw turtle eggs, consuming the yolks. When the diet was changed to chicken eggs two months later, the lizard died.

Mr. Harrisson and Mr. Haile believe the lizard can stay in a comatose state underground for long periods with no food and little air. It apparently uses its strong snout and head, rather than its weak front legs, to burrow into the ground. Earth sticking to its skin helps make it difficult to notice when it is moving.

The observers said it seemed to enjoy being handled and became tame, showing "no inclination to bite either the handler or anything else," food included. They doubt if the lizard is poisonous.

This was the first specimen to be collected in recent times. Others are being sought at Niah. The Borneo lizard and two American lizards form the family Helodermatidae.

• Science News Letter, 80:27 July 8, 1961

MEDICINE

Simple New Cancer Test Based on Enzyme Action

➤ A SIMPLE new laboratory test for detecting cancer has been reported following clinical tests.

Based on earlier studies showing that the activity of the enzyme lactic dehydrogenase (LDH) was associated with the presence of cancer, the research was done by a University of California School of Medicine student in San Francisco. Russell J. Erickson of the Cancer Research Institute received his M.D. degree this June.

The test could help physicians treat patients who have a symptom called effuson (in which there is an abnormal, unexplained escape of fluid into various parts and tissues of the body), a possible sign of cancer.

The scientist said the study indicates that difficult-to-diagnose cancer also can be detected in patients with tuberculosis and cirrhosis, a liver ailment.

LDH acts as a catalyst in the chemical processes of the body as all enzymes do, the researcher reports in the Journal of the American Medical Association, 176:794, 1961.

Also reported in the JAMA is an analysis of the dangers of influenza epidemics for those over 65 years of age, for pregnant women and for persons with certain chronic diseases connected with aging. Vaccines are believed 60% to 65% effective in preventing flu. Drs. Theodore C. Eickhoff and Robert E. Serfling, with Ida L. Sherman, all of the U. S. Public Health Service's Communicable Disease Center, Atlanta, Ga. (p. 776)

• Science News Letter, 80:27 July 8, 1961

TECHNOLOGY

Electron Accelerator For Overseas Research

See Front Cover

➤ AN ELECTRON accelerator will soon be shipped to irradiation service centers in Tokyo and Paris for scientific research. It will also be used for sterilization of sutures and other pharmaceutical products, such as scalpel blades, drugs and bandages and to pasteurize foods.

A close-up view of the accelerator rings of the Dynamitron, produced by Radiation Dynamics, Inc., Westbury, N. Y., is seen on the cover of this week's SCIENCE NEWS LETTER. The rings feed the power into the vacuum tubes. Electrons are "sprayed" at very high speeds into the materials to be tested or processed.

• Science News Letter, 80:27 July 8, 1961

CHEMISTRY

Demand for Chemists Exceeds the Supply

➤ THE NUMBER of jobs open for chemists in this country continues to greatly exceed the number of chemists looking for jobs. Dr. B. R. Stanerson, deputy executive secretary of the American Chemical Society, reported to the American Institute of Chemists.

The ratio of "column inches" of positions open to "column inches" of positions wanted in Chemical and Engineering News reflects the changes in the chemical manpower status. The average number of interviews per job applicant at the Employment Clearing House at the national meetings of the American Chemical Society provides another barometer of the ratio of supply to demand.

The "column inch" ratio was approximately one to eight in May of 1931. This past May this ratio was approximately five to one, which ratio has been rather constant for the past 20 years.

Dr. Stanerson predicted that the average demand-supply picture would continue to be "good" to "very good." The most wanted chemists will continue to be highly educated and imaginative people.

• Science News Letter, 80:27 July 8, 1961

• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

ANATOMY AND PHYSIOLOGY—Diana Clifford Kimber, Carolyn E. Gray and Caroline E. Stackpole; 14th ed. rev. by Lutie C. Leavell—*Macmillan,* 779 p., illus., $6.95. Formerly titled Textbook of Anatomy and Physiology, brought up to date.

ANTENNA ENGINEERING HANDBOOK—Henry Jasik, Ed.—*McGraw,* 1,040 p., illus., $22. Readily accessible source of basic information for antenna design specialists, electronics engineers and systems engineers.

ATLAS OF THE OTHER SIDE OF THE MOON—N. P. Barabashov, A. A. Mikhailov and Yu. N. Lipskiy, Eds., transl. from Russian by Leon Ter-Oganian—*Acad. of Science of the USSR (Pergamon),* 141 p., 30 full-page illus., $7. Results of a reconstruction of the first Russian photographs of the back side of the moon, with detailed catalogue describing objects found.

AUGUSTINE TO GALILEO. Vol. I: Science in the Middle Ages, V-XIII Centuries. Vol. II: Science in the Later Middle Ages and Early Modern Times, XIII-XVII Centuries—A. C. Crombie—*Harvard Univ. Press,* 2nd ed., 296 p., 380 p., illus., $5.50 per set. Reissue of standard work on medieval scientific thought.

CHEMISTRY FOR THE SPACE AGE—Dan Q. Posin—*Lippincott,* 680 p., illus., $5.60. Lively introduction to chemistry with tests, application exercises and problems to solve, following each of the 62 sections.

COLLEGE ALGEBRA—Paul K. Rees and Fred W. Sparks—*McGraw,* 4th ed., 428 p., $6.50. Retains informal style with new subjects added.

CORK AND THE CORK TREE—Giles B. Cooke—*Pergamon,* 121 p.. illus., $7.50. Single source of general information about cork, including history, botanical characteristics, physical properties, chemical composition, manufacture and production data.

CRIME AND JUVENILE DELINQUENCY: A Rational Approach to Penal Problems—Sol Rubin, foreword by Hermann Mannheim—*Oceana,* 2nd ed., 248 p., $5; paper $1.85. Penologist's analysis of correctional problems, with a critical look at legislation and court procedure.

ELECTRICAL ENGINEERING—S. B. Hammond—*McGraw,* 566 p., illus., $8.75. Modern textbook for engineering students majoring in other areas of engineering.

EXPLORING MATHEMATICS ON YOUR OWN—Donovan A. Johnson and William H. Glenn—*Doubleday,* 303 p., illus., $4.50. More than 400 mathematical puzzles, games and problems designed to stimulate student's interest, first published in pamphlet form by *Webster* in 1960.

GEMSTONES AND MINERALS: How and Where to Find Them—John Sinkankas—*Van Nostrand,* 387 p., illus. by author, photographs, $8.95. Practical information on gem collector's field work, with basic background on rock classes, field features of mineral deposits and how they are formed.

GOURMET COOKERY FOR A LOW-FAT DIET—Elise Cavanna and James Welton—*Prentice-Hall,* rev. ed., 174 p., $3.50. Tasty recipes avoiding not only butter but all oils, fats and egg yolk.

A HISTORY OF FIREARMS—Harold L. Peterson—*Scribner,* 58 p., illus. by Daniel D. Feaser, $3.50. Well illustrated short history for young people.

HOW DOES IT WORK?—Richard M. Koff—*Doubleday,* 288 p., illus. by author and Richard E. Rooman, $3.95. Alphabetically arranged, tells in simple terms how gadgets and household machinery are made to work, from aerosols to zippers.

THE HYPOTHALAMUS OF THE CAT: A Cytoarchitectonic Atlas in the Horsley-Clarke Coordinate System—Ruth Bleier, M.D.—*Johns Hopkins Press,* 109 p., 11 x 15 inch., illus., $15. Detailed description, documented by 30 photomicrographs at a magnification of 22, of importance to workers in fields concerned with the central nervous system.

INTRODUCTION TO ENGINEERING MECHANICS—John V. Huddleston—*Addison-Wesley,* 493 p., illus., $9.75. Emphasizes the fundamentals of mechanics in a one-year course.

INTRODUCTON TO GEOMETRY—H. S. M. Coxeter—*Wiley,* 443 p., illus., $9.95. Attempts to revitalize interest in geometry, presenting four years of college work, the unifying thread being the idea of a group of transformations or symmetry.

INTRODUCTON TO SOIL MICROBIOLOGY—Martin Alexander—*Wiley,* 472 p., illus., $9.50. Blends the practical interests of the agronomist and the more theoretical concerns of the microbiologist in the treatment of microbial ecology, the carbon and the nitrogen cycle, mineral transformations, and ecological interrelationships.

AN INTRODUCTION TO THE THEORY AND PRACTICE OF TRANSISTORS—J. R. Tillman and F. F. Roberts—*Wiley,* 340 p., illus., $8. One-volume treatment to provide quantitative understanding of the physical effects on which minority-carrier transistors depend for their electrical behavior.

INTRODUCTORY CHEMISTRY—Otto W. Nitz—*Van Nostrand,* 2nd ed., 631 p., illus., $7.95. College chemistry textbook for liberal arts students.

JEDDITO 264: Report No. 7 of the Awatovi Expedition—Hiroshi Daifuku—*Peabody Mus.,* 96 p., illus., paper, $4.85. On the excavation of a Basket Maker III-Pueblo I site in northeastern Arizona.

JOURNAL OF STRUCTURAL CHEMISTRY, Vol. I, No. 1—G. B. Bokii, Ed.; transl. from Russian "Zhurnal Strukturnoi Khimii," Vol. I, No. 1, May-June, 1960—*Consultants,* 120 p., illus., paper, $20; annual subscription, $80. Translation from page-proofs to assure prompt coverage of Soviet research on the molecular structure of matter.

KINETICS AND CATALYSIS, Vol. I, No. 1—G. K. Boreskov, Ed.; transl. from Russian "Kinetika i Kataliz." Vol. I, No. 1, May-June, 1960—*Consultants,* 162 p., illus., paper, $35; annual subscription, $150. Complete translation of new publication of the Academy of Sciences of the USSR.

LIMITS OF ALLOWABLE CONCENTRATIONS OF ATMOSPHERIC POLLUTANTS, Book 4, 1960—V. A. Ryazanov, Ed., transl. by B. S. Levine—*OTS,* 123 p., paper, $2.75. Collection of technical reports related to the determination of allowable atmospheric concentration in the USSR.

MEN IN SPACE: Profiles of the Leaders in Space Research, Development and Exploration, Vol. II—Shirley Thomas—*Chilton Co.,* 238 p., photographs, $3.95. Biographical sketches of space pioneers, among them A. Scott Crossfield, Hugh L. Dryden, William H. Pickering and Fred L. Whipple.

PARACHUTIST'S SPIN PROBLEM—Otto Walchner and Frank Sawyer—*ARL (OTS),* 12 p., illus., paper, 50¢. See story p. 29.

PLASTIC FLOW AND FRACTURE IN SOLIDS—Tracy Y. Thomas—*Academic,* 267 p., $8.50. Based on work done in the last five years on the growth and decay of discontinuities in continuous media.

PRESERVING HUMAN VALUES IN AN AGE OF TECHNOLOGY: The Franklin Memorial Lectures, Vol. IX—Edgar G. Johnston, Ed.—*Wayne State Univ. Press,* 132 p., $4. Includes lecture by Edward U. Condon on "The Challenge of Science to Human Values."

PROBABILITY: A First Course—Frederick Mosteller, Robert E. K. Rourke and George B. Thomas, Jr.—*Addison-Wesley,* 319 p., $5. Introduces each new concept through examples and offers exercises with each section.

SOUTHERN CALIFORNIA GARDENS: An Illustrated History—Victoria Padilla—*Univ. of Calif. Press,* 359 p., illus., $10. Brings together from many sources a complete picture of the development of ornamental horticulture in Southern California, describing both persons and plants.

STATE ACTION TO IMPLEMENT MEDICAL PROGRAMS FOR THE AGED: Staff Report—Special Committee on Aging, U.S. Senate—*GPO,* 72 p., paper, 35¢. Results of survey of the effectiveness of the Federal-State Kerr-Mills program of grants-in-aid for medical assistance for the aged.

STRONTIUM 90 IN MILK AND AGRICULTURAL MATERIALS IN THE UNITED KINGDOM, 1959-1960—Agricultural Research Council Radiobiological Laboratory—*Her Majesty's Stationery (Brit. Inform. Serv.),* 81 p., paper, 95¢. Survey of animal bones, and experimental studies.

TAXONOMIC KEYS TO THE COMMON ANIMALS OF THE NORTH CENTRAL STATES: Exclusive of the Parasitic Worms, Insects and Birds—Samuel Eddy and A. C. Hodson—*Burgess,* rev. 3rd ed., 162 p., illus., paper, $3.25. Abbreviated aid in classification, with bibliography to the more important reference works.

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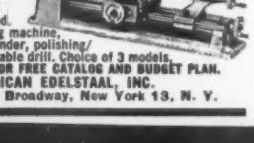

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FORESTRY

Need Seeds for U.S. Trees

➤ MORE THAN 25,000 tons of forest tree seeds will be required if the need for planting trees in the continental United States is met, a Government-employed research forester estimates.

Paul O. Rudolf of Lake States Forest Experiment Station, St. Paul, Minn., said some 50,000,000 acres in the United States, excluding Alaska and Hawaii, need planting.

He gave these four reasons:

The land is not restocking naturally with desirable trees. It is eroding, idle or unprofitably used. Trees would provide protection for farm fields, animals and buildings. "The United States is going to need all the timber we can grow."

Most seeds are collected from wild stands, but there is a growing trend toward special stands and orchards treated to foster heavy seed production, primarily in the South, Mr. Rudolf said. More such projects are expected.

Public forestry agencies are the biggest users of the seeds. Use by forest industries and commercial seed dealers is growing, however. All buy their stocks principally from "small private collectors."

Seeds should be collected when they are ripe and before they have suffered deterioration on the tree or on the ground. Collectors judge ripeness by such factors as fullness, size, color, degree of "milkiness," hardness of coat, and attractiveness to animals. For some pines and spruces, ripeness can be better determined if the new-picked cones float in test liquids—such as linseed oil for eastern white pine and blue spruce, turpentine for white spruce, and kerosene for red and sugar pines.

Seeds of many species have to be cleaned of fruit parts or debris to stop spoilage, save storage space, and make handling and sowing easier. Some need their seedcoats softened as pretreatment to assure sprouting. Others require cold, moist treatment or fall sowing.

Laboratory tests determine the rate of sowing. Nursery and field germination of forest tree seeds is usually 50% to 80% of laboratory germination, but further post-germination losses normally occur.

The number of usable seedlings per 100 living seeds sown ranges from 10 to 60 for conifers. The variation is even wider for broadleaf species.

Mr. Rudolf said increased efforts by Federal, State and industrial agencies to obtain high-quality seeds and improve their handling will help provide "for the forestation of those 50,000,000 acres in the best and quickest way."

His comments are included in "Seeds," the 1961 Yearbook of Agriculture, published by the U. S. Department of Agriculture and sold by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at $2.00 a copy.

• Science News Letter, 80:29 July 8, 1961

METEOROLOGY

Earlier Storm Warnings

➤ EARLIER WARNINGS of hurricanes threatening life and property are now possible.

The period of uncertainty as to when a hurricane may curve towards land can probably be shaved by hours by spotting a characteristic change in the hurricane's eye, Alexander Sadowski of the U. S. Weather Bureau's emergency warning section told the American Meteorological Society's hurricane conference in Miami Beach, Fla. Radar stations scattered along the coast would pick out this definite change from the many temporary wobblings of the hurricane's center.

Hurricane forecasters presently know only the general area where the hurricane will recurve and not a specific location.

"Immediate report of the location of recurvature as observed by land-based radar can make more timely warnings available for some areas and the cancellation for areas no longer vulnerable," Mr. Sadowski said.

Hurricane recurvature occurs "when westerly winds engulf the hurricane and carry it along." Virtually all hurricanes from the Caribbean or lower latitudes head northwest, veering northeast when they meet the westerlies.

Hurricane warnings are now provided six to 12 hours in advance, depending on the type of hurricane. When a hurricane first threatens a coast, a target area ranging from 100 to 200 miles is posted indicating where the hurricane is likely to strike. As it approaches, storm warnings are then issued more frequently.

Mr. Sadowski's method is expected to give coastal areas much faster warnings.

• Science News Letter, 80:29 July 8, 1961

AERONAUTICS

High-Altitude Spins Can Be Fatal to Man

➤ PARACHUTISTS falling free from high altitudes may be subjected to spin rates more than three times as rapid as the 150 revolutions per minute possibly fatal to man, research conducted at the Wright-Patterson Air Force Base Aeronautical Research Laboratory, Dayton, Ohio, shows.

A scale parachutist model representing a 200-pound body was tested under conditions simulating a fall from 83,000 feet, about 15.7 miles. Falling in a lying down on the back position, the model went into spins at rates as high as 465 revolutions per minute. Maximum spin rates occurred at 50,000 feet after some 65 seconds of fall.

• Science News Letter, 80:29 July 8, 1961

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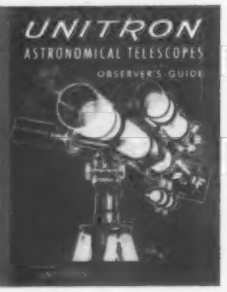

With artificial satellites already launched and space travel almost a reality, astronomy has become today's fastest growing hobby. Exploring the skies with a telescope is a relaxing diversion for father and son alike. UNITRON's handbook contains full-page illustrated articles on astronomy, observing, telescopes and accessories. It is of interest to both beginners and advanced amateurs.

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INVENTIONS

Patents of the Week

A blood pressure recorder used in studies on pressure suits for space flights has been patented. A hypodermic needle and a submarine device were other inventions.

➤ MAN'S FIRST journey into space received a big boost by a medical instrument just patented.

Three former U.S. Air Force doctors patented a blood pressure recorder that was used in the first studies on pressure suits for space flights. The doctors are George D. Zuidema, University Hospital surgeon, Ann Arbor, Mich.; Robert E. Edelberg, Baylor University College of Medicine professor, Houston, Texas; and Edwin W. Salzman, surgeon, Massachusetts General Hospital, Boston, Mass.

"The recorder (patent No. 2,989,051) was used in human tolerance studies for prolonged rocket acceleration," Dr. Zuidema told SCIENCE SERVICE. "It was developed to meet the need of measuring and maintaining records of the blood circulation of humans confined to pressure suits up to hours at a time."

The men in pressure suits, forerunners of the budding generation of astronauts, were subjected to various atmospheric and temperature changes in human centrifuges and high altitude pressure chambers at Wright-Patterson Air Force Base, Dayton, Ohio. Their blood pressure and pulse rates were continually taken by the instrument and recorded on tape for a permanent record.

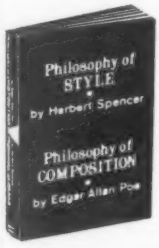
"The device was the prototype of the sophisticated recording devices that were probably used to record the reactions of astronaut Alan B. Shepard Jr. on his hop into space," Dr. Zuidema said.

A disposable hypodermic needle that makes a clean puncture as it enters the skin won patent No. 2,989,053 for Donald A. Hamilton, Burbank, Calif. Rights were assigned to Don Baxter, Inc., Glendale, Calif. A pointed needle with sharp triangular cutting edges does away with the chances of tissue damage and other irritations normally occurring when ordinary hypodermic needles with beveled points are used, the patent stated.

An SOS signal in the form of a ball popping up to the surface from a submarine in trouble was patented by Sebastian J. Tralongo, Rockville, Md., who assigned rights of patent No. 2,989,024 to Vitro Corporation of America, New York. A pressurized container filled with gas bursts open as it reaches the surface, releasing a dye or smoke bombs.

Dr. Vladimir K. Zworykin, radio-television pioneer, and two other scientists have refined the picture on colored television by controlling the light output of phosphors, which are substances that light up when excited by radiation. Dr. Zworykin and Jan A. Rajchman, Princeton, N.J., and Edward G. Ramberg, Huntingdon Valley, Pa., received patent No. 2,989,582 for the invention and assigned the rights to Radio Corporation of America (RCA). A color-image producer is controlled by "signal strips" that distribute the time a radiating or electron beam rests on colored phosphors.

• Science News Letter, 80:30 July 8, 1961



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Questions

DENTISTRY—Which bacteria normally found in the mouth caused tooth decay? p. 26.

MEDICINE—What are some advantages of a new anesthetic G-29? p. 20.

OCEANOGRAPHY—How many feet has the ocean level dropped due to a rift in the ocean bottom? p. 23.

Photographs: Cover, Radiation Dynamics, Inc.; p. 19, Mrs. Frederick E. Lederer; p. 21, United States Steel Corporation; p. 23, Fremont Davis; p. 26, National Institute of Dental Research; p. 32, David O. Alber Associates, Inc.

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TREE GUIDE for sportsmen, naturalists and educators lists on punched cards the 260 major native and foreign trees found in continental United States, Canada and Alaska. A sorting needle inserted into the holes and notches coded to certain tree characteristics sorts out the desired tree. Each card is illustrated and has descriptive text.

• Science News Letter, 80:32 July 8, 1961

PORTABLE RECORD PLAYER is a transistorized, battery-operated record player that plays all four conventional speed records. The lightweight player, the size of a hatbox, has a detachable lid for record storage and a seamless scuff-proof case. Available in blue, charcoal or red.

• Science News Letter, 80:32 July 8, 1961

SWIM LUNG is for underwater swimming of adults or children. A face mask complete with intake and exhaust valves is connected to two air-filled rubber floats, strapped to the back, by a plastic hose.

• Science News Letter, 80:32 July 8, 1961

PIANO CHORD UNIT, shown in the photograph, is an electro-magnetic device built into a piano and is intended to simplify piano playing. A set of 72 buttons is located on the left side of the keyboard. A person can play a tune with right hand while playing accompanying piano chords

by numbered buttons with only one finger of left hand.

• Science News Letter, 80:32 July 8, 1961

INDOOR SKI SLOPE for beginners and professionals permits year-round skiing regardless of weather. Skiers whisk down a nylon "snow carpet" revolving on an endless belt. The carpet speed and slope are adjustable and a safety bar for beginners is provided. Available in large or junior sizes for indoor ski centers or home recreation rooms.

• Science News Letter, 80:32 July 8, 1961

MANICURE SET contains scissors, cuticle pusher, nail cleaner and file that fit into a holder shaped like a shell. Available in aqua or pink, the 4½-inch holder and handles are made of polystyrene plastic with a mother-of-pearl finish.

• Science News Letter, 80:32 July 8, 1961

ADJUSTABLE DESK RACK of aluminum can be expanded to hold large books and catalogues or contracted to store file folders. The aluminum ribbed rack weighs only two pounds.

• Science News Letter, 80:32 July 8, 1961

CORRUGATED PLASTIC PANELING reinforced with glass fibers is well suited for awnings, signs, breezeways, and special roofing. Available in 50-foot lengths and 40-inch widths, the panels are rolled into place for speedy installation and may be cut, sawed, nailed or drilled with regular tools. Crinkle finished on both sides, the material comes in several colors as well as clear.

• Science News Letter, 80:32 July 8, 1961

Nature Ramblings

➤ SCOTLAND has the thistle, England the rose and France the fleur-de-lis. But the United States has no national flower.

Serious attempts to have one adopted began in 1889 when the goldenrod, now the floral emblem of five states, was indecisively chosen. Like all subsequent suggestions, it never received an unqualified vote of confidence from the people nor a legal stamp of approval from Congress.

In 1929, a minor battle raged through the newspapers when the American Nature Association sponsored a national poll in which more than 86,000 persons voted. The wild rose won over the columbine by 20,000 votes. Next in popularity were goldenrod, phlox, violet, daisy, dogwood and beauty rose.

In 1959 the Florist Telegraph Delivery Association sponsored another contest and the rose won again, this time in competition with marigold, corn tassel, Kentucky blue grass and black-eyed Susan, among others.

At present, eight separate resolutions naming specific flowers are pending in Congress. Both the Senate Judiciary Committee and the House Administration Committee

National Flower

received resolutions in favor of the American marigold and the corn tassel during the current session. The Senate also has one for the carnation, and the House has one for the Shasta daisy and two for the rose.

The biggest stumbling block to adoption of a national flower is the fact that some objection can be cited for almost any nominee. In addition to being popular, symbolic, bound in tradition and suitable for emblems and designs, a national flower should be available the year round and thus able to thrive indoors as well as out.

—GLORIA BALL

• Science News Letter, 80:32 July 8, 1961

Do You Know?

The cost of *forest* fire protection in 1960 averaged 57¢ for every United States citizen.

In 1960, *transistors* accounted for $301,000,000 of the $509,000,000 semi-conductor market in the United States.

"Thirsty" *glass* is used in transistors to absorb moisture that would affect the efficiency of the devices.

In 1960 nearly 90% of the *pork* in storage was frozen and the remainder cured, while in 1935, nearly 75% was cured and 25% frozen.

The frequency of occurrence of certain types of *cancer* in both men and women vary with the socio-economic status, according to long-term statistical studies.

When a new crop is introduced to an area, the local *insects* may find the new food more attractive and switch from their old standby crops.

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